THE UTILITY OF BOTANICAL GARDENS IN THE MODERN WORLD

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It should display plants of certain geographic formations, such as desert plants, alpine plants, marshy plants, aquatic plants.

It should display weeds, and methods for their control, and should demonstrate the use of weeds and other common plants for economic purposes.

It should display collections of different varieties of cultivated plants, especially of ornamental plants, and ideas useful in organizing various gardens, such as spring border, summer border, fall border, annual flower border, continuously blooming border, planting for shady places, planting of drought-resistant plants; and individual gardens of irises, phlox, peonies, dahlias, poppies, cannas, lilies, astilbe, primulas, violas, and ferns. It has also been suggested that orchids, gentians, and grasses can be displayed as individual gardens.

It should display plants mentioned in classical and religious literature; state flowers, national flowers, and favorite flowers of the locality.

A botanical garden should have a medicinal plant garden; a morphological or biological garden, in which to display seed dispersal and physiological processes in plants; a genetics or breeding garden in which to display the laws of heredity and horticultural hybrids; a taxonomic (or systematic) garden in which to display plant families.

There should be an arboretum, a fruticetum, a section devoted to economic plants; greenhouses for propagating and cultivating plants; conservatories or show houses for display; nurseries, and so forth.

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There should be an herbarium, library, art and photographic studios, lecture pavilion, and recreational facilities.

If we accept all the views of the specialists, as summarized above, the utility of botanical gardens in the modern world is fully established, since all the fundamental and applied aspects of botany come within the purview of the botanical garden, and it becomes the center of horticultural, agricultural, and silvicultural activities, besides being the center of cultural activities of the region in which it is located.

If we trace the history of the development of the botanical gardens of the world, we find that these gardens in the West started as centers of cultural activities. Later workers specialized in different directions and created institutions moulded to their special interests. The earliest botanical garden of the West seems to have been organized by Aristotle in 350 B.C. He was a Greek philosopher, logician, mathematician, astronomer, metaphysician, and biologist. He was, in fact, a personality in which all the sciences of his age combined.

In India, if the systematic cultivation of medicinal plants and plants of economic importance in gardens can be considered as a botanical activity, as has been done in the West, it can be shown that botanical gardens existed at a very early date.

In the edict of King Ashoka (220 B.C.), inscribed on a rock in Pali language at the foot of the Girnar Hill in Junagarh, Gujarat State, we find the following.

"Everywhere in the dominions of King Priyadarshi (Ashoka), Beloved of the Gods, and likewise in the bordering

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territories such as those of the Chodas [Cholas] and Pandyas as well as of the Satyaputra and the Keralaputra [Kerala] as far south as Tamraparni [Ceylon] and in the territories of the Yavana [Greek] King Antiyoka [Antiochus, one of Alexander's generals and a king in Asia Minor after the death of Alexander] and also the kings who are the neighbors of the said Antiyoka—everywhere King Priyadarshi, Beloved of the Gods, has arranged for two kinds of medical treatment, namely, medical treatment for human beings, and medical treatment for animals. And, wherever there were no medicinal herbs beneficial to human beings and animals, everywhere they have been caused to be imported and planted. Wherever there were no roots and fruits, everywhere they have been caused to be imported and planted. On the roads, wells have been caused to be dug and trees have been caused to be planted for the enjoyment of animals and human beings."

There is another earlier reference to a great Indian physician, who made an intensive survey of the medicinal plants of India on the suggestion of his preceptor. This famous physician, known as Jivaka Komarabhacca, flourished during the reign of King Bimbisara of Magadh [modern Bihar] from 546 to 494 B.C.

These are two striking references, by undoubted authorities on early Indian history, to the study of Indian medicinal plants and their cultivation. Attempts to search earlier records lead us to legends and mythology. One such legend seems to have some value and is worth considering here. This has been recorded by a Greek Ambassador, Megasthenes, who visited India in 300 B.C. and left a history of India full of very useful observations. According to him, "The men of greatest learning among the Indians tell certain

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legends of which it may be proper to give a brief summary. They relate that in the most primitive times, when the people of the country were still living in villages, Dionysos made his appearance coming from the regions lying to the west and at the head of a considerable army. He overran the whole of India." ".....Having after this turned his attention to the artificial propagation of useful plants, he communicated the secret to the Indians and taught them the way to make wine, as well as other arts conducive to human well-being. He was, besides, the founder of large cities, which he formed by removing the villages to convenient sites, while he also showed the people how to worship the deity, and introduced laws and courts of justice. Having thus achieved altogether many great and noble works he was regarded as a deity and gained immortal honours." Who was Dionysos or Bacchus? According to Megasthenes, Father Bacchus was the first who invaded India. From him to Alexander the Great, 6,451 years are reckoned with three months additional, the calculations being made by counting the kings who reigned in the intermediate periods, to the number of one hundred and fifty-three.

These early Indian traditions preserved in Greek literature have their counterpart in the Sanskrit literature of India, where the deified Dionysos or Bacchus is replaced by a great Yogi who gave arts and sciences to his devotees. He is known as Siva. His followers carry a trident, as did the followers of Dionysos or Bacchus, and worship a round elongated stone, called lingam in Sanskrit, like the phallus.

According to Indian tradition, Lord Siva and his disciples laid the foundation of a large number of cities in India. Many of them exist today and are places of pilgrimage, Banaras being one of them. His disciples roam

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about India as Vairagis or monks and are revered as repositories of ancient knowledge, especially of herbs and medicinal plants. They generally stay near towns on the banks of rivers in small hermitages, where they plant vegetation for utility and beauty. These gardens have been in existence throughout India for thousands of years and have been repeatedly mentioned in ancient Sanskrit literature. They functioned as the botanical gardens of the Old World.

Thus the botanical gardens in the West and in the East appeared with the growth of human culture. They were essentially utilitarian and functioned as the center of human progress. They, in fact, reflected the growth of human culture of the regions in which they were situated. Today, also, the botanical gardens reflect the glory of a nation or of a country. It is very significant in Indian history, which runs through thousands of years, that these gardens have flourished with the rise of different dynasties and dwindled away with their fall. In the modern period, during the progress of Mughals, East India Company, and the British, botanical gardens also prospered; and with their fall botanical gardens decayed. Now with India's independence, they are again coming up like mushrooms. Efforts are being made to organize small centers of cultivation of useful plants for their study and use. Government and private organizations are giving attention to this aspect of social life, and it is hoped that very soon a network of botanical gardens will start functioning to revive an intensive botanical activity. It is therefore essential that the well-trained workers in the field take the initiative in directing the energy released during the social, political, and economic upheaval of the East after the cessation of the Second World War and organize botanical gardens.

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The modern world faces many problems. Our population is increasing at a remarkable rate. The food supply here in the East is not enough to keep the people in a healthy state. Fertile areas are limited. Forests are being cut down to meet agricultural demands. More lands are being cultivated. Deserts are encroaching here and there, and in the arid zones saline and alkaline formations are increasing. Only a botanist with a synthetic approach can tackle such problems, and a botanical garden where he can plan, organize, and accumulate material for his extensive work, is a necessity. A well-organized botanical garden is equipped to train men so that they will be able to assume the responsibilities in various botanical activities, that the modern world demands from them.

In India, a humble attempt has been made in this direction. At Lucknow, in the National Botanic Gardens, an attempt has been made to demonstrate the usefulness of such efforts. Within a period of thirteen years such problems as desert reclamation, cultivation in alkaline soils, and education of workers on mass scale have been successfully demonstrated. Side by side with these activities, the fundamental work in the botanical and phytochemical fields has also been carried out.

An exchange of ideas is the keynote of human progress. The botanical gardens are the most innocent, but the most effective way of bringing about the diffusion of healthy ideas. History shows how the botanical gardens and the museums in the West have given facilities to workers where they may extend their knowledge with the least efforts. The idea of evolution in plants and animals would have remained meaningless, if the visual representation of plants and animals had not been organized in the botanical gardens, museums, and herbaria of the West.

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Then, again, for the exchange of plant material botanical gardens are a necessity. Most of us forget the part played by botanical gardens in the development of modern industry. A little thought would bring to light that all the modern industrial development would not have occurred, if the West had not tried to bring spices from the East. It is the mingling of the West with the East, or the East with the West, that has created the modern world with space astronauts. The more we blend with each other, the more vitality we shall develop to achieve the ideals of the human race. Hawaii is ideally situated for such efforts. To us in the East it is the rising sun, and to the West it is the glorious setting sun.

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